Geophysical Research Abstracts
Vol. 17, EGU2015-11800, 2015
EGU General Assembly 2015

Modeling of intercontinental Saharan dust transport: What consequences on atmospheric concentrations and deposition fluxes in the Caribbean?

Benoit Laurent (1), Paola Formenti (1), Karine Desboeufs (1), Julie Vincent (1), Cyrielle Denjean (2), Guillaume Siour (1), and Olga L. Mayol-Bracero (3)

(1) LISA, University Paris Diderot, LISA, France (benoit.laurent@lisa.u-pec.fr), (2) Leibniz Institute for Tropospheric Research (TROPOS), Leipzig, Germany, (3) Institute for Tropical Ecosystem Studies (ITES), University of Puerto Rico, San Juan, USA

The Dust Aging and Transport from Africa to the Caribbean (Dust-AttaCk) project aims todocument the physical and optical properties of long-range transported African dust to the Caribbean. A comprehensive field campaign was conducted in Cape San Juan, Puerto Rico (18.38°N 65.62°W) during June-July 2012, offering the opportunity to constrain the way Saharan dust are transported from North Africa to the Caribbean by 3D models.
Our main objectives are: (i) to discuss the ability of the CHIMERE Eulerian off-line chemistry-transport model to simulate atmospheric Saharan dust loads observed in the Caribbean during the Dust-AttaCk campaign, as well as the altitude of the dust plumes transport over the North Atlantic Ocean up to the Caribbean, (ii) to study the main Saharan dust emission source areas contributing to the dust loads in the Caribbean, (iii) to estimate the Saharan dust deposition in the Caribbean for deposition events observed during the Dust-AttaCk campaign.
The dust model outputs are hourly dust concentration fields in μg m-3 for 12 aerosol size bins up to 30 μm and for each of the 15 sigma pressure vertical levels, column integrated dustaerosol optical depth (AOD), and dry and wet deposition fluxes.The simulations performed for the Dust-AttaCk campaign period as well as satellite observations (MODIS AOD, SEVIRI AOD) are used to identify the Saharan emission source regions activated and to study the evolution of the dust plumes tothe Cape San Juan station. In complement, the vertical transport of dust plumes transported from Saharan dust sources and over the North Atlantic Ocean is investigated combining model simulations and CALIOP observations. Aerosol surface concentrations and AOD simulated with CHIMERE are compared with sin-situ observations at Cape San Juan and AERONET stations. Wet deposition measurements performed allow us to constrain dust deposition flux simulated in the Caribbean after long-range transport.